

## **Mohtashim Shamsi (PhD)**

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**Southern**  
Illinois University  
**Carbondale**

## **Education**

**PhD**, University of Toronto, 2008-2012.

Major: Bioanalytical Chemistry

Dissertation Title: Electrochemical Studies of DNA Films on Gold Surfaces

**MS**, Gwangju Institute of Science and Technology, 2006-2008.

Major: Materials Science and Engineering

Dissertation Title: Synthesis and Characterization of Halloysite Nanotubes Composites

**M.Sc.**, University of Karachi, 2002-2003.

Major: Inorganic Chemistry

Dissertation Title: Kinetic of Fe(III)-Siderophore Complexes at Acidic pH.

**B.Sc. (Hon)**, University of Karachi, 1999-2002.

Major: Chemistry

## **Postdoctoral Research**

University of Toronto, 2012-2015.

Major: Analytical/Bioanalytical Chemistry

Project: Integration of Electrochemical Biosensors in Digital Microfluidic Devices

## **Professional Experience**

Assistant Professor, 2015-Date.

Department: Chemistry and Biochemistry

Institution: Southern Illinois University Carbondale

Research Areas: Electrochemistry, Biosensors, and Microfluidics

Sessional Lecturer, 2013-2014.

Department: Chemistry and Biochemistry

Institution: Ryerson University

Teaching Courses: 1<sup>st</sup> yr General Chemistry and 4<sup>th</sup> yr Analytical Instrumentation

Sessional Lecturer, 2003-2006.

Department: Chemistry

Institution: University of Karachi

Teaching Courses: General Chemistry, Analytical Chemistry, Inorganic Chemistry

## Publications

### Journal Articles

- Qamar, A. Z., Amar, K., Chowdhury, F., Kohli, P. and Shamsi, M. H. (2016) Wax Patterned Microwells for Stem Cell Fate Study. *RSC Advances*, 6, 104919-104924.
- Yu, Y., Shamsi, M. H., Krastev, D. L., Dryden, M. D., Leung, Y., Wheeler, A. R. (2016) A microfluidic method for dopamine uptake measurements in dopaminergic neurons. *Lab on a Chip*, 16(5), 543-552.
- Shamsi, M. H., Choi, K., Ng, A. H., Chamberlain, M. D., Wheeler, A. R. (2016) Electrochemiluminescence on digital microfluidics for microRNA analysis. *Biosensors and Bioelectronics*, 77, 845-852.
- Rackus, D. G.,\* Shamsi, M. H.,\* Wheeler, A. R. (2015) Electrochemistry, Biosensors and Microfluidics: A Convergence of Fields. *Chemical Society Review*, 44, 5320-5340. (\* Equal contribution)
- She, Z., Topping, K., Shamsi, M. H., Wang, N., Chan, N. W., Kraatz, H.-B. (2015) Investigation of the utility of complementary electrochemical detection techniques to examine the in vitro affinity of bacterial flagellins for a toll-like receptor 5 biosensor. *Analytical chemistry*, 87(8), 4218-4224.
- Shamsi, M. H., Choi, K., Ng, A. H., Wheeler, A. R. (2014) A digital microfluidic electrochemical immunoassay. *Lab on a Chip*, 14(3), 547-554.
- Shamsi, M. H., Kraatz, H.-B. (2013) Electrochemical signature of mismatch in overhang DNA films: a scanning electrochemical microscopic study. *Analyst*, 138, 3538-3543.
- Dryden, M. D., Rackus, D. D., Shamsi, M. H., Wheeler, A. R. (2013) Integrated digital microfluidic platform for voltammetric analysis. *Analytical chemistry*, 85(18), 8809-8816.
- Alam, M. N., Shamsi, M. H., Kraatz, H.-B. (2012) Scanning positional variations in single-nucleotide polymorphism of DNA: an electrochemical study. *Analyst*, 137(18), 4220-4225.
- Shamsi, M. H., Kraatz, H.-B. (2011) Electrochemical identification of artificial oligonucleotides related to bovine species. Potential for identification of species based on mismatches in the mitochondrial cytochrome C 1 oxidase gene. *Analyst*, 136(22), 4724-4731.
- Shamsi, M. H., Kraatz, H.-B. (2011) The effects of oligonucleotide overhangs on the surface hybridization in DNA films: an impedance study. *Analyst*, 136(15), 3107-3112.
- Shamsi, M. H., Kraatz, H.-B. (2010) Probing nucleobase mismatch variations by electrochemical techniques: exploring the effects of position and nature of the single-nucleotide mismatch. *Analyst*, 135(9), 2280-2285.
- Shamsi, M. H., Luqman, M., Basarir, F., Kim, J.-S., Yoon, T.-H., Geckeler, K. E. (2010). Plasma-modified halloysite nanocomposites: effect of plasma modification on the structure and dynamic mechanical properties of halloysite-polystyrene nanocomposites. *Polymer International*, 59(11), 1492-1498.
- Khan, A., Shamsi, M. H., Choi, T.-S. (2009). Correlating dynamical mechanical properties with temperature and clay composition of polymer-clay nanocomposites. *Computational Materials Science*, 45(2), 257-265.

Shamsi, M. H., Geckeler, K. E. (2008). The first biopolymer-wrapped non-carbon nanotubes. *Nanotechnology*, 19(7), 075604.

### Book Chapters

Shamsi, M. H., Kraatz, H.-B. (2015). Scanning Electrochemical Microscopy: A Multiplexing Tool for Electrochemical DNA Biosensing. *Handbook of Nanoelectrochemistry*, ed. by M. Aliofkhaezai, A-H, Makhlof, Springer International Publishing, (pp. 1074-1093). ISBN: 978-3-319-15265-3.

Diakowski, P. M., Shamsi, M. H., H.-B. Kraatz (2012). Electrochemical Detection of Basepair Mismatches in DNA Films. *Electrochemical DNA Biosensors*, ed. by M. Ozsoz, Pan Stanford Publishing, (pp. 205-244). ISBN: 9789814241779.

### Patent

Yu, Y., Shamsi, M. H., Wheeler, A. R. Digital Microfluidic Devices with Integrated Electrochemical Sensors. WO 2016/061684A1 (Apr 28, 2016)

Shamsi, M. H., Geckeler, K. E. Gold Nanoparticle-Halloysite Nanotube and Method of Forming the Same. US20090092836 A1 (Apr 9, 2009).

### Presentations

Shamsi, M. H. (Author & Presenter), "Microfluidic Electrochemical Biosensors," Department of Chemistry, University of Karachi, Karachi (Dec 21, 2016). (**Invited Talk**)

Shamsi, M. H. (Author & Presenter), 14th Eurasia Conference on Chemical Sciences, "Bioanalysis on Chip: Developing Low Cost Platforms to Detect Disease Biomarkers," ICCBS, Karachi (Dec 17, 2016). (**Invited Talk**)

Shamsi, M. H. (Author & Presenter), "Bioanalytical Microfluidics: A Transition from Photolithography to Desktop Printing," George Mason University, Fairfax, VA (Nov. 17, 2016). (**Invited Talk**)

Shamsi, M. H. (Author & Presenter), Choi, K. (Author), Ng, A. (Author), Yu, Y. (Author), Chamberlain, M. (Author), Wheeler, A. (Author), Optofluidics Conference 2016, "Digital Microfluidic Electrochemical Bioassays," Beijing, China. (July 26, 2016). (**Invited Talk**)

Shamsi, M. H. (Author & Presenter), 90<sup>th</sup> ACS Symposium on Colloid and Surfaces, "Understanding Fidelity of Wax Micropatterns", Harvard University, Massachusetts (Jun 7, 2016). (**Talk**)

Shamsi, M. H. (Author & Presenter), 26th Anniversary World Congress on Biosensors, "Bioelectrochemistry on Digital Microfluidics", Gothenburg, Sweden (May 26, 2016). (**Talk**)

Shamsi, M. H. (Presenter), The Kentucky Lake Local Section of the ACS, "Chemistry Graduate Program in Southern Illinois University Carbondale," American Chemical Society, University of Tennessee, Martin. (November 19, 2015). (**Invited Talk**)

Shamsi, M. H. (Author & Presenter), The Kentucky Lake Local Section of the ACS, "Microfluidic Electrochemical Biosensors," American Chemical Society, University of Tennessee, Martin. (November 19, 2015). (**Invited Talk**)

Shamsi, M. H. (Author & Presenter), Choi, K. (Author), Ng, A. (Author), Chamberlain, M. (Author), Wheeler, A. (Author), The 19th International Conference on Miniaturized Systems for Chemistry and Life Sciences, "Electrochemiluminescence on Digital Microfluidics for microRNA Analysis," Micro Total Analysis Systems, Gyeongju. (October 28, 2015). (**Poster**)

- Shamsi, M. H. (Author & Presenter), California State University, Fullerton, "Microfluidic Electrochemical Biosensors," California State University, Fullerton, Fullerton, CA, US. (January 2015). **(Invited Talk)**
- Shamsi, M. H. (Author & Presenter), California State University, Long Beach, "Microfluidic Electrochemical Biosensors," California State University, Long Beach, Long Beach, CA, US. (January 2015). **(Invited Talk)**
- Shamsi, M. H. (Author & Presenter), University of New Brunswick, "Microfluidic Electrochemical Biosensors," University of New Brunswick, Fredericton, NB, Canada. (January 2015). **(Invited Talk)**
- Shamsi, M. H. (Author & Presenter), Wheeler, A. (Author), Lab-on-a-Chip, Microfluidics & Microarray World Congress, "Digital Microfluidics: An Emerging Platform for Electrochemistry and Biosensing," SELECTBIO Conference, San Diego, CA, US. (December 19, 2014). **(Poster)**
- Shamsi, M. H. (Author & Presenter), Wheeler, A. (Author), 96<sup>th</sup> Canadian Chemistry Conference and Exhibition, "Digital microfluidics with integrated electrochemical sensor for immunoassays.," Canadian Society for Chemistry, Quebec City, Quebec, Canada. (May 28, 2013). **(Oral)**
- Shamsi, M. H. (Author & Presenter), Kraatz, H.-B. (Author), 243<sup>rd</sup> National Meeting and Exposition (Chemistry of Life), "Electrochemical Studies of Mismatches and Overhangs in DNA films on Gold.," American Chemical Society. (March 2012). **(Oral)**
- Shamsi, M. H. (Author & Presenter), Kraatz, H.-B. (Author), "Discrimination of the Single Nucleotide DNA Mismatches at Different Sequence Positions by Impedance Spectroscopy.," Electrochemical Society Symposium, Western University, London, Canada. (September 2010). **(Poster)**
- Shamsi, M. H. (Author & Presenter), Kraatz, H.-B. (Author), 93<sup>rd</sup> Chemistry Conference and Exhibition, "Probing Nucleobase Mismatch Variations by Electrochemical Techniques: Exploring the Effects of Position and Nature of the Single-Nucleotide Mismatch.," Canadian Society for Chemistry, Toronto, Canada. (May 2010). **(Poster)**
- Shamsi, M. H. (Author & Presenter), Bin, X., Kraatz, H.-B., 92<sup>nd</sup> Chemistry Conference and Exhibition, "Single-Nucleotide Mismatches Detection Using an Electrode Microchip," Canadian Society for Chemistry. (May 2009). **(Poster)**
- Shamsi, M. H. (Author & Presenter), Geckeler, K., 15<sup>th</sup> International Conference on Composites/Nano Engineering, "Nanocomposites of Inorganic Nanotubes and Gold.," International Conference on Composites/Nano Engineering, Haikou, Hainan Island, China. (July 2007). **(Oral)**
- Shamsi, M. H. (Author & Presenter), Geckeler, K. (Author), 99<sup>th</sup> National Meeting of Korean Chemical Society, "Solubilization of Halloysite by a Mechanochemical Approach," Korean Chemical Society, Seoul, South Korea. (April 2007). **(Poster)**

## Awards and Grants

1. Early Career Travel Award to attend The Midwestern Universities Analytical Chemistry Conference (MUACC) **2016**, University of Illinois Urbana Champaign.
2. EnergyBoost Seed Grant, (PI), Southern Illinois University Carbondale, \$50,000, **2016**.
3. Elevated Research 2.0 Seed Grant, (PI), Southern Illinois University Carbondale, \$2,500, **2016**.

4. Faculty of Arts and Science Graduate Student Conference Travel Grant, University of Toronto, **2012.**
5. School of Graduate Studies Conference Grant, University of Toronto, **2012.**
6. Scholarship for PhD in France, Higher Education Commission of Pakistan, (Declined) **2006.**
7. Graduate Research Scholarship, Gwangju Institute of Sci. & Technology, Gwangju, **2006.**
8. Conference Travel Award for ACS Meeting, National Science Foundation, Pakistan, **2003.**
9. Gold Medal: First class first Position in M.Sc., University of Karachi, **2004.**
10. Research Grant for M.Phil. Research, Higher Education Commission of Pakistan, **2004.**

## **Synergistic Activities**

1. **Professional Membership**, American Chemical Society. (September 16, 2015 - Present).
2. **Supervisor/Mentor** (2 graduate students; PhD and MSc.)
3. **Reviewer, scientific journals** (*Lab Chip, Sensors, Biotechnology Journal, Biosensors and Bioelectronics, Analytical Methods, Sensor, Talanta*)